



## Engineering Sciences Section – 2008

---

### **C23 Particle Contaminant Separation and Purification From a Nutritional Powder Supplement Using Light Microscopy**

*Richard S. Brown, MS\*, MVA Scientific Consultants, 3300 Breckinridge Boulevard, Suite 400, Duluth, GA 30096*

After attending this presentation, attendees will gain an understanding and appreciation of how light microscopy can be used to examine complex powders and to separate contaminants that are present at or below the detection limits of complimentary analytical techniques.

This paper will impact the scientific and forensic community by demonstrating a limitation to bulk analytical methods by demonstrating that purification of a complex powder mixture by hand picking contaminants can increase the analytical sensitivity exponentially.

The goal of this presentation is to present to the forensic community information about how the microscopical analysis of a complex powder supplement and subsequent isolation of contaminant particles by handpicking, can increase the detection limits for further analytical testing.

The microscopical analysis of a nutritional powder supplement resulted in the isolation of a few milligrams of a suspected contaminant. Testing the bulk powder by conventional analytical techniques resulted in trace amounts of the contaminant being detected. Because the contaminant concentration was so low in the bulk product, light microscopy was used to search the individual particles comprising the powder for particles that were unlike the manufactured powder product. Once the possible contaminant particles were located, they were removed from the powder matrix by hand until a few milligrams of material was isolated and the hand-picked particles were subjected to further conventional analytical testing. The subsequent analytical testing of the now concentrated contaminant confirmed the identity of the contaminant that was not possible in the bulk powder form due to its low concentration. One hundred retains were examined using light microscopy to determine if the manufacturing process could have created the contaminant. Contaminant particles were not observed in any of the retain samples, suggesting that the contaminant particles were from an outside source and not a result of the manufacturing process. This case illustrates a situation where separation of a solid particle contaminant from a bulk powder product was not possible by conventional liquid extraction techniques but was possible by mechanical and physical extraction techniques augmented by light microscopy.

#### **Microscopy, Contaminant, Particles**